output a synthesized color image or multicolor image. The image forming apparatus employing such an image-transferring belt is useful as a color image forming apparatus, or a multiple color image forming apparatus. The image forming apparatus employing the image-transferring belt is also useful as an image forming apparatus for high-speed formation.

A1 cont.

Please substitute the paragraphs starting at page 3, line 4 and ending at page 4, line 9 with the following replacement paragraphs. A marked-up copy of these paragraphs, showing the changes made thereto, is attached.

As a photosensitive material, a-Si absorbs moisture on its surface under high humidity conditions, which tends to cause smudging of the toner image to result in blurring of the formed image. Smudging the toner is not the only condition, which adversely affects the quality of the image. Other conditions affecting the quality of the image include adhering matters include various foreign matters deposited onto the photosensitive material surface such as fine dust of paper usually used as the recording sheet, organic components released from the paper, and corona products generated by corona discharge at a high voltage in the apparatus. In particular, under high humidity conditions, the deposited matter lowers the resistivity of the photosensitive material, resulting in lower sharpness of the latent image and lower quality of the recorded image. To prevent the image blurring simply and effectively, usually the moisture absorption on the photosensitive material surface is prevented by employing a heater to apply electric current throughout whole days.

A2

Such image forming apparatuses are required to save energy and to decrease industrial waste so as not to cause environmental pollution as in Blue Angel and Energy Star Program. Therefor, a method for preventing the image blurring on the a-Si photosensitive material is demanded which does not require a waiting power of the aforementioned whole-day electricity application system. Further, elongation of the lives of the members like the photosensitive member, the intermediate image-receiving member, and image transfer belt of the electrophotography apparatus is required to decrease waste.

A2 CONT.

Please substitute the paragraph starting at page 6, line 5 and ending at page 6, line 13 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

SUB A

--Hitherto, such problems have been dealt with by changing the material of or the shape of the intermediate image-transfer member of the image-transferring belt, contact conditions, and stretching conditions thereof. However, a-Si has not been studied as the factor for preventing the fine vibration, toner melt adhesion, and foreign matter deposition, so that the problem has not been solved satisfactorily.--

A3

Please substitute the paragraphs starting at page 18, line 13 and ending at page 18, line 20 with the following replacement paragraphs. A marked-up copy of these paragraphs, showing the changes made thereto, is attached.

SUB C1

--Fig. 1 shows schematically a constitution of an example of a color image forming apparatus having an intermediate image-transfer member for an electrophotographic process.

A4

A4 cont.

Fig. 2 shows schematically a constitution of an example of a color image forming apparatus having an image-transferring belt for an electrophotographic process.

Please substitute the paragraph starting at page 19, line 2 and ending at page 19, line 8 with the following replacement paragraphs. A marked-up copy of these paragraphs, showing the changes made thereto, is attached.

Fig. 6 is a schematic view of a friction testing apparatus for evaluating friction between the photosensitive member and the intermediate image-transfer member.

A5

Fig. 7 is a schematic view of a friction testing apparatus for evaluating friction between the photosensitive member and the image-transferring belt.

Please substitute the paragraphs starting at page 20, line 8 and ending at page 22, line 2 with the following replacement paragraphs. A marked-up copy of these paragraphs, showing the changes made thereto, is attached.

This image forming apparatus has a photosensitive drum 1 of a rotating drum type which is the first image-holding member, and is constituted of an electrophotographic sensitive member which is used in repetition. On the surface of this photosensitive drum, an electrostatic latent image is formed, and then a toner is allowed to be deposited onto the electrostatic latent image to form a toner image. Around

A6

photosensitive drum 1, there are disposed a primary electrifier 2 for electrically charging the surface of photosensitive drum 1 at a prescribed polarity and potential uniformly, and an imaging light projector not shown in the drawing for projecting imaging light 3 onto the electrified surface of photosensitive drum 1. There are also disposed developing devices:

a first developing device 41 for depositing a magenta toner M, a second developing device 42 for depositing a cyan toner C, a third developing device 43 for depositing a yellow toner Y, and a fourth developing device 44 for depositing a black toner B. Further there are disposed a photosensitive member cleaner 14 for cleaning the surface of photosensitive drum 1 after transfer of the toner image onto an intermediate image-transfer member 20.

SUB C23 Intermediate image-transfer member 20 is placed so as to be rotatable by contact with photosensitive drum 1, having core metal 21 in a pipe shape, and elastic layer 22 formed on the peripheral face of core metal 21. To core metal 21, bias power source 61 is connected which applies a primary transfer bias for transferring the toner image formed on photosensitive drum 1 onto intermediate image-transfer member 20. By the side of intermediate image-transfer member 20, transfer roller 25 is placed for transferring further the transferred toner image kept on intermediate image-transfer medium 20 onto recording sheet 24, the transfer roller being held by an axis parallel with the rotation axis of intermediate image-transfer member 20 to be brought into contact with the bottom face of intermediate image-transfer member 20. Transfer member cleaner 35 is disposed for cleaning the remaining toner on the surface of intermediate image-transfer member 20 after transfer of the toner image from intermediate image-transfer member 20 onto recording sheet 24. To transfer roller 25, bias power source 29 is connected to apply a secondary transfer bias for transferring the toner image from intermediate image-transfer member 20 to recording sheet 24.--

A6 cont.

Please substitute the paragraphs starting at page 25, line 16 and ending at page 26, line 1 with the following replacement paragraphs. A marked-up copy of these paragraphs, showing the changes made thereto, is attached.

--The color image forming apparatus employing such an intermediate image-transfer member according to an electrophotographic method has various advantages in comparison with the conventional one, for example disclosed in Japanese Patent Application Laid-Open No. 63-301960, in which a recording sheet is fixed by sticking or adhesion onto a transfer drum and plural color images are repeatedly transferred in superposition from an image holding member, in the following points. The advantages are as explained below.

A7

Firstly, color deviation is less. In other words, color registration is more precise superposition of the color images.--

Please substitute the paragraph starting at page 28, line 16 and ending at page 28, line 26 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

--In Fig. 2, as shown by arrow marks, the photosensitive drums 1a to 1d are rotated clockwise, and image-transferring belt 8 is circulated counterclockwise. Photosensitive drums 1a to 1d and image-transferring belt 8 are driven at prescribed speeds, so that their relative speeds are kept constant in principle. Naturally, a slight speed variation which does not adversely affect the image formation is considered to be constant in the relative speed, similarly as in the case of the intermediate image-transfer member described above.--

A8

Please substitute the paragraph starting at page 31, line 2 and ending at page 31, line 5 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

A usual photosensitive member 300 for electrophotographic image forming apparatus is explained by reference to Fig. 3, which is a schematic sectional view.

A9

Please substitute the paragraph starting at page 32, line 21 and ending at page 33, line 8 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

Deposition assembly 400 has vertical reaction vessel 401, a vacuum vessel. Protrusion 404 is provided on the side wall of reaction vessel 401 for application of high-frequency electric power. Plural gas introduction pipes 403 extending vertically are provided inside along the side wall of reaction vessel 401. Gas introduction pipes 403 have many small holes on the side walls along the length direction. Heater 402 is provided in a spiral form vertically at the center of reaction vessel 401. At the tope of reaction vessel 401, a openable cap 401a is provided for insertion of cylindrical substrate 412 as the base of photosensitive drum 1 into reaction vessel 401. Substrate 412 is placed so as to enclose heater 402 inside.

A10

Please substitute the paragraph starting at page 33, line 21 and ending at page 34, line 12 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

--Firstly, substrate 412 as the base of the photosensitive drum is placed in reaction vessel 401. The reaction vessel is closed with cap 401a, and is evacuated to a prescribed pressure or lower by an evacuation assembly which is not shown in the drawing. With the evacuation continued, substrate 412 is heated from inside by heater 402 to keep substrate 412 at a prescribed temperature ranging from 20°C to 450°C. With substrate 412 kept at the prescribed temperature, a prescribed source gas or gases corresponding to the intended photosensitive layer are introduced through introduction pipe 403 into reaction vessel 401 at a flow rate controlled respectively by a flow controller (not shown in the drawing) for the respective source gas introduction systems. The introduced gas is allowed to fill reaction vessel 401 and is evacuated through evacuation pipe 407 to the outside of vessel 401 to keep the inside pressure of reaction vessel 401 at the prescribed pressure.--

A11

Please substitute the paragraph starting at page 38, line 16 and ending at page 39, line 1 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

--The holder 603 is adjusted by a balance arm to contact horizontally to the photosensitive element 601 in the state where a load has not been applied. The holder 603 has a top pan and by adjusting the load to be applied to this top pan, a contact pressure between the photosensitive element 601 and the intermediate transferring element 602 can be adjusted. In the holder 603, a load transducer 604 is further installed to detect a force, which is applied in a horizontal direction (in a left and right directions shown in Fig. 6) perpendicularly to rotation axis of the photosensitive element 601 and the intermediate transferring element 602.--

A12

Please substitute the paragraph starting at page 43, line 22 and ending at page 44, line 7 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

A13

The friction evaluation apparatus of Figs. 6 and 7 are installed in a known environment-testing box or an environment-testing chamber, in which an internal environment can be controlled to a predetermined condition, an environment for installing the friction evaluation apparatus is set to a predetermined temperature and humidity, and then it was allowed to stand for 24 hours or more to make the condition of the photosensitive element and the cleaning member matched to the environment set. Then, as described above, by measuring the friction coefficient and the kinetic friction deviation coefficient, characteristics such as temperature dependency can be evaluated.

Please substitute the paragraph starting at page 45, line 26 and ending at page 46, line 14 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

A14

For an electric characteristic of the photosensitive element, it is preferable that a variation caused by the environmental change is small. Specifically, it is preferable that a change ratio of electrifiability in change of a temperature (hereafter, temperature characteristic) falls in the range of ±2 V/°C. According to such condition, characteristics, of the photosensitive element, influencing on latent image formation and toner image formation become stable without a considerable effect of environment. And, by using the photosensitive element satisfying this condition, an image-forming apparatus capable of

forming an image with a high quality stably and preferably can be constituted and a cleaning condition such as the state of toner left after transfer become stable.

A14 cont.

Please substitute the paragraphs starting at page 48, line 9 and ending at page 49, line 27 with the following replacement paragraphs. A marked-up copy of these paragraphs, showing the changes made thereto, is attached.

As the method for measuring the state of localization level in such band gap, as a rule, deep level spectrophotometry, isothermal capacity transient spectrophotometry, photothermal polarization spectroscopy, photoacoustic spectroscopy, and constant photocurrent method are used. Among these, the constant photocurrent method (hereafter, CPM) is useful as the method for convenience measurement of the subgap light absorption spectrum on the basis of the localization level of a-Si : H.

A15

Measurement in the present experimental example was carried out by this CPM. CPM is the method for measurement of the energy level of a sample by irradiating a light of a predetermined wavelength changing a light quantity to make a photocurrent of a thin film sample constant.

In the present experimental example, for measuring characteristic energy Eu of the tail of the exponential function, the following photosensitive element was prepared for testing,. By employing the above-described film-forming apparatus and the method comparable to a manufacturing method of the photosensitive element to be tested, an a-Si film sample with a film thickness of about 1 μm was deposited on a glass substrate (commercial name: 7059 made by Corning Inc.) and an Si wafer, which have been mounted on a cylindrical sample holder, under a condition of preparation of

photoconductive layer. An Al comb electrode for measurement of characteristic energy Eu was vaporized on a deposit film sample formed on the glass substrate to prepare the photosensitive element to be tested. A test was carried out by using spectrophotometer SS-25GD (commercial name) made by Nippon Bunkou Corporation, current supply amplifier LI-76 (commercial name) made by NF Circuit Corp., and a lock-in made by the same corporation amplifier 5610B (commercial name).

A15 cont.

On the other hand, as the image-forming apparatus of electrophotographic system for a temperature characteristic evaluation, an image-forming apparatus was user modified for electric characteristics evaluation by installing a modified electricpotential sensor for the surface of the photosensitive element housed in NP6750, made by Canon Inc. in the NP6750. Furthermore, a heater of a photosensitive element was modified to make the temperature of the photosensitive element variable and a noncontact thermometer was installed for preparation.

Please substitute the paragraphs starting at page 51, line 26 and ending at page 53, line 6 with the following replacement paragraphs. A marked-up copy of these paragraphs, showing the changes made thereto, is attached.

As described above, the image forming apparatus, by which the image is practically formable on the recording material P, is used, a toner is used which is made by Canon Inc., i.e., NP6750 toner, and a member of the image-transferring belt 208 used was various similar to the experimental example 1 including the transferring blade. As the photosensitive element, the photosensitive element prepared differs in the friction

A16

characteristics of the surface through adjusting a composition of material gases and discharging electric power.

By using such various image-transferring belts and photosensitive bodies, the contact pressure between the image-transferring belt 208 and the a-Si photosensitive element 201 was changed in a range from 0 (adjusting mechanisms opened) to 1500 g/cm^2 (147kPa) and the image-forming apparatus was put in the environment-testing chamber, and the installing environment for the image-forming apparatus was put under a condition adjusted to a low temperature and low humidity environment (hereafter, "L/L environment") of 10°D and 15 percent, respectively, a normal temperature and a normal humidity environment (hereafter, "N/N environment") of 23°C and 50 percent, respectively, and a high temperature and high humidity environment (hereafter, "H/H environment") of 33°C and 85 percent, respectively, in order to conduct a paper-passing duration test. Where, in the L/L environment and the N/N environment, a test was conducted by turning a photosensitive element heater to OFF and in the H/H environment, a test was conducted by turning the photosensitive element heater to OFF and also by turning the photosensitive element heater to ON accompanying with various temperatures for temperature-setting--

A16 cont.

On page 54, replace Table 1 with the following Table 1.

Table 1

	Symbol	Determination standard
Very good	A	No fixing of toner to the surface of the photosensitive element.
Good	B	Toner fixed is 1.5 mm or less in diameter and three or fewer in number; no black line occurs.
No problem practically	C	There is toner, which has been fixed to the surface of the photosensitive element, matched the determination standard "good" or more superior; the black line caused by fixing is 1.5 mm or shorter in length and five or fewer in number.
There are some practical problems	D	According to fixing of toner to the surface of the photosensitive element, the black line occurred in a grade of and over the determination standard, "no problem practically."

A17

Please substitute the paragraph starting at page 56, line 17 and ending at page 57, line 3 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

--In addition, in the case where the contact pressure between the image-transferring belt 208 and the a-Si photosensitive element 201 was changed higher from the above-described preferable range to make the friction force larger and where the temperature was set higher to work the photosensitive element heater, the temperature considerably rose occasionally. In the case where the temperature of the contact part of the cleaning member was 60°C or higher, toner fixed occasionally to the surface of the photosensitive element and the cleaning member. In an excessively high temperature,

A18

toner fixes to the photosensitive element to make latitude for such occurrence as fusion appearing on the image narrow, to be not preferable.

A18 cont.

Please substitute the paragraph starting at page 58, line 9 and ending at page 59, line 3 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

--The following examination was carried out for a surface shape of the intermediate transferring element or the image-transferring belt and the photosensitive element. The surface of the photosensitive element before use and after being subjected to the paper-passing duration test was observed by using an AFM (atomic force microscope). As the result, it was found that a filming quantity differs particularly in a recessed part corresponding to an average inclination Δa of the surface of the photosensitive element. In addition, a correlation was found between this filming quantity and occurrence of image flow. Thus, it was known that for suppressing formation of the filming film, adjusting the surface shapes of the intermediate transferring element or the image-transferring belt and the photosensitive element brings a splendid effect. By adjusting the surface shapes of the intermediate transferring element or the image-transferring belt and the photosensitive element, particularly in the image-forming apparatus having no photosensitive element heater, formation of the filming film can be suppressed and thus, image flow can be also prevented.--

A19

Please substitute the paragraph starting at page 59, line 26 and ending at page 60, line 24 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

--On the a-Si photosensitive element, it has been known that an abnormally-grown projection part, which has a diameter ranging from several micrometers to several hundred micrometers and a height ranging from several micrometers to several ten micrometers and formed around a nucleus being injury of and dust on a substrate in film formation, is formed. Such projection is a big one having a different size than typical one in evaluation of the roughness Ra of a center line and the average inclination Δa. Filming and fusion occasionally occur because of this projection. Then, by a photosensitive element surface treatment method disclosed in the specification of Japanese Patent No. 2047474 (Japanese Patent Publication No. 07-077702) a treatment for reducing the height of the abnormally-grown projection. As a result, concerning filming and fusion caused by such projection, it has been known that when the height of the projection is the same as the or less than a particle size of toner, specifically, 5 μm or less, they do merely occur. This may be because influenced by high surface hardness of the a-Si photosensitive element, a part captured by the intermediate transferring element or the image-transferring belt becomes small and occurrence of injury is suppressed and hence, small vibration and fusion caused by this small vibration are prevented.--

A20

Please substitute the paragraph starting at page 64, line 2 and ending at page 64, line 5 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

--Next, on the image-forming apparatus satisfying the above-described preferred conditions resulting from the above-described experimental examples, further specific examples will be described.--

A21

Please substitute the paragraph starting at page 68, line 3 and ending at page 68, line 6 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

--Under the above-described conditions, image forming was carried out and a transfer efficiency, an image quality, and durability for repetition of copying were tested and confirmed.--

A22

Please substitute the paragraph starting at page 68, line 24 and ending at page 69, line 9 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

--When the image forming test was repeatedly carried out, a voided character was not generated, a fine line could be outputted with a good quality, and for a filled image, an the image with an even quality was yielded. After a duration test by passing ten thousands sheets of paper, the good quality image similar to an initial stage was yielded and the secondary transfer efficiency was 95 percent and showed almost no deterioration. A microscopic observation of the surface of the intermediate transferring element after the duration test by passing twenty thousands sheets of paper almost merely showed occurrence of filming of toner yielding a good result.--

A23

Please substitute the paragraph starting at page 69, line 15 and ending at page 70, line 2 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

--As the photosensitive element, the aluminum cylinder with the 62 mm diameter and the thickness of about 3mm was used as a base body and the a-Si photosensitive element having the a-C surface layer was also used. Morphology of the surface of the photosensitive element was prepared to have the average roughness Ra 0.03 μm of the center line and the average inclination Δa of 0.03. On the surface of the photosensitive element, a light emission diode to emit a light mainly composed of a 700 nm peak wavelength was used to do pre-exposure and image exposure was carried out by using a semiconductor laser having a 680 nm peak wavelength to form a static latent image. As the image-transferring belt, one made from the material same as that of the Example 1 was used.--

A24

Please substitute the paragraph starting at page 70, line 20 and ending at page 70, line 25 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

--Reference numeral 1 denotes a rotative drum-type electrophotographic photosensitive element (hereafter, photosensitive drum) repeatedly used as a first image carrier and rotatively driven in the predetermined circumferential velocity (processing speed) in a clockwise direction shown by an arrow.--

A25

Please substitute the paragraphs starting at page 71, line 25 and ending at page 72, line 11 with the following replacement paragraphs. A marked-up copy of these paragraphs, showing the changes made thereto, is attached.

--The intermediate image-transferring belt 20 is rotatively driven in the predetermined circumferential velocity (a circumferential velocity the same as that of the photosensitive drum 1) in the clockwise direction.

Yellow toner image of the above-described first color formed and borne on the photosensitive drum 1, during the process in which it passes through a nip part of the photosensitive drum 1 and the intermediate image-transferring belt 20, by an electric field formed by a primary transfer bias, which is applied from a primary transfer roller 62 to the intermediate image-transferring belt 20, is sequentially and intermediately transferred (primarily transferred) to an outer circumferential face.--

A26

Please substitute the paragraph starting at page 72, line 24 and ending at page 73, line 1 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

--The reference numeral 63 is a secondary transferring roller born in parallel with an opposite roller 64 for a secondary transfer and installed on a bottom face part of the intermediate image-transferring belt 20 in a separable state.--

A27

Please substitute the paragraph starting at page 74, line 18 and ending at page 74, line 22 with the following replacement paragraph. A marked-up copy of this paragraph, showing the changes made thereto, is attached.

The above-described toner left after transfer is statically transferred to the photosensitive drum 1 in the nip part of and around the photosensitive drum 1 and hence, the intermediate image-transferring belt is cleaned.

A28

Please substitute the paragraphs starting at page 75, line 5 and ending at page 76, line 3 with the following replacement paragraphs. A marked-up copy of these paragraphs, showing the changes made thereto, is attached.

In addition, on the contact face of the photosensitive drum 1 to the intermediate image-transferring belt (the same in case of the above-described cylindrical intermediate transferring element and image-transferring belt,) as described above, respective parts are rotatively driven in the same circumferential velocity, as a rule, in the same direction.

However, with a purpose to improve transfer efficiency and the like, in the range not badly influencing image formation, a previously-determined small relative speed difference in the above-described circumferential velocity, in other words, a small difference in circumferential velocity, may be set.

A29

Needless to say, similar to case of the cylindrical intermediate transferring element and the image-transferring belt, a very small speed variation caused by variability and shift of rotative drive can be regarded as a constant relative speed.

In the present example, as the photosensitive element, the aluminum cylinder with the 80 mm diameter and the thickness of about 3 mm was used as the base body and the a-Si photosensitive element, negatively charged, having amorphous